# ISO TC184/SC4/WG10 N269

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**ISO/PDTS 10303-1004**

**Product data representation and exchange: Application module: Elemental shape**



**ABSTRACT:**

This document is a draft of the proposed application module for elemental shape. It describes definitional information for the concept of shape and how it is composed.

**KEYWORDS:**

module, elemental shape, shape

**COMMENTS TO READER:**

This document has been reviewed and noted by the ISO TC 184/SC4 Quality Committee and SC4 Secretariat and has been determined to be ready for this ballot cycle.

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# Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75% of the member bodies casting a vote.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of normative document:

— an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50% of the members of the parent committee casting a vote;

— an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

An ISO/PAS or ISO/TS is reviewed every three years with a view to deciding whether it can be transformed into an International Standard.

ISO/PDTS 10303-1004 was prepared by Technical Committee ISO/TC 184, Industrial automation systems and integration, Subcommittee SC4, Industrial data.

This International Standard is organized as a series of parts, each published separately. The parts of ISO 10303 fall into one of the following series: description methods, integrated resources, application interpreted constructs, application modules, application protocols, abstract test suites, implementation methods, and conformance testing. The series are described in ISO 10303-1. A complete list of parts of ISO 10303 is available from the Internet:

<http://www.nist.gov/sc4/editing/step/titles/>.

Annexes A and B form an integral part of this part of ISO 10303. Annexes C, D and E are for information only.

# Introduction

ISO 10303 is an International Standard for the computer-interpretable representation and exchange of product data. The objective is to provide a neutral mechanism capable of describing product data throughout the life cycle of a product, independent from any particular system. The nature of this description makes it suitable not only for neutral file exchange, but also as a basis for implementing and sharing product databases and archiving.

This International Standard is organized as a series of parts, each published separately. The parts of ISO 10303 fall into one of the following series: description methods, integrated resources, application interpreted constructs, application protocols, application modules, abstract test suites, implementation methods, and conformance testing. The series are described in ISO 10303-1. This part of ISO 10303 is a member of the application module series.

This part of ISO 10303 specifies an application module for elemental shape. It provides for the definition of the concept shape and how a shape may be formed, but does not include specifications for the geometric model representations of shapes.

For an example of bringing together a set of application modules to provide the capability to assign shape elements to layers and visual attributes, such as colours and curve fonts, to geometric and topological elements, see Annex F of ISO 10303-1009.

# Industrial automation systems and integration — Product data representation and exchange — Part 1004: Application module: Elemental shape

## 1 Scope

This part of ISO 10303 specifies the application module for elemental shape. The following are within scope of this part of ISO 10303:

— the definition of the concept shape;

— how a shape may be formed.

The following are outside the scope of this part of ISO 10303:

— the specification of geometric modeling approaches for shape representation, such as wireframe or boundary representation (b-rep).

## 2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO/IEC 8824-1:1994, *Information technology — Open systems interconnection — Abstract syntax notation one (ASN.1) — Part 1: Specification of basic notation.*

ISO 10303-1:1994, *Industrial automation systems and integration — Product data representation and exchange — Part 1: Overview and fundamental principles.*

ISO 10303-11:1994, *Industrial automation systems and integration — Product data representation and exchange — Part 11: Description methods: The EXPRESS language reference manual.*

ISO/DIS 10303-41:[1] *Industrial automation systems and integration — Product data representation and exchange — Part 41: Integrated generic resource: Fundamentals of product description and support.*

[1)] To be published.

ISO/DIS 10303-42:[1] *Industrial automation systems and integration — Product data representation and exchange — Part 42: Integrated generic resource: Geometric and topological representation.*

ISO/DIS 10303-43:[1] *Industrial automation systems and integration — Product data representation and exchange — Part 43: Integrated generic resources: Representation structures.*

ISO 10303-202:1996, *Industrial automation systems and integration — Product data representation and exchange — Part 202: Application protocol: Associative draughting.*

ISO 10303-1001:[1] *Industrial automation systems and integration — Product data representation and exchange — Application module: Appearance assignment.*

ISO 10303-1006:[1] *Industrial automation systems and integration — Product data representation and exchange — Application module: Foundation representation.*

# 3 Terms, definitions, and abbreviations

## 3.1 Terms defined in ISO 10303-1

For the purposes of this part of ISO 10303, the following terms defined in ISO 10303-1 apply:

— application;

— application object;

— application protocol;

— application reference model;

— data;

— information;

— integrated resource;

— product;

— product data;

— unit of functionality.

## 3.2 Terms defined in ISO 10303-202

For the purposes of this part of ISO 10303, the following terms defined in ISO 10303-202 apply:

[1)] To be published.

— application interpreted construct.

## 3.3 Terms defined in ISO 10303-1001

For the purposes of this part of ISO 10303, the following terms defined in ISO 10303-1001 apply:

— application module.

## 3.4 Abbreviations

For the purposes of this part of ISO 10303, the following abbreviations apply:

| | |
|---|---|
| AM | application module |
| ARM | application reference model |
| MIM | module integrated model |
| UoF | unit of functionality |
| URL | uniform resource locator |

# 4 Information requirements

This clause specifies the information requirements for elemental shape. The information requirements are specified as a set of units of functionality and application objects. The information requirements are defined using the terminology of the subject area of this application module.

NOTE 1 - A graphical representation of the information requirements is given in annex C.

NOTE 2 - The mapping specification is specified in 5.1 which shows how the information requirements are met using the integrated resources of this International Standard. The use of the integrated resources introduces additional requirements which are common to application modules and protocols.

EXPRESS specification:

```
*)
SCHEMA elemental_shape_arm;
(*
```

## 4.1 Units of functionality

This subclause specifies the units of functionality (UoF) for this part of ISO 10303 as well as any support elements needed for the application module definition. This part of ISO 10303 specifies the following units of functionality:

— elemental_shape.

This part of ISO 10303 uses the following units of functionality:

— foundation_representation.

The units of functionality and a description of the functions that each UoF supports are given below. The application elements included in the UoFs are defined in 4.3.

### 4.1.1 elemental_shape

The elemental_shape UoF specifies the definitional information for the concept of shape and how it is composed. The following application entities are specified in the elemental shape UoF:

— Cartesian_coordinate_space;

— Detailed_model_element;

— Detailed_geometric_model_element;

— Geometric_model;

— Template_instance;

— Transformation.

### 4.1.2 foundation_representation

This UoF is defined in the foundation representation module. The following application entities from this UoF are referenced in the elemental shape module:

— Representation;

— Representation_item.

## 4.2 Required AM ARMs

The following EXPRESS reference statements specify the elements imported from the ARMs of other modules.

EXPRESS specification:

```
*)
USE FROM foundation_representation_arm; -- ISO 10303-1006
(*
```

## 4.3 ARM entity definitions

This subclause specifies the application entities for the elemental shape module. Each application entity is an atomic element that embodies a unique application concept and contains attributes specifying the data elements of the entity. The application entities and their definitions are given below.

### 4.3.1 Cartesian_coordinate_space

A Cartesian_coordinate_space is the coordinate space where geometric elements are defined. It is either two-dimensional or three-dimensional. An origin for coordinate values is implicitly defined. The units applicable to the coordinate values of elements defined in the Cartesian_coordinate_space are specified.

EXPRESS specification:

```
*)
ENTITY cartesian_coordinate_space;
  unit : SET[2:?] OF REAL;
END_ENTITY;
(*
```

Attribute definitions:

**unit:** The unit specifies the various kinds of unit in which values are measured. In the case where geometric elements are defined in the Cartesian_coordinate_space there shall be at least two units specified, the length unit and the plane angle unit. The same length unit is applied to each coordinate direction. Only one unit of a kind shall be specified.

NOTE - If elements with different units are required they have to be separated into different models with their own Cartesian_coordinate_space.

EXAMPLE - A length measure unit measured in inches and an angle measure unit measured in degrees are examples for two attributes 'unit' assigned to the same Cartesian_coordinate_space.

### 4.3.2 Detailed_model_element

A Detailed_model_element is a single element of a model. A Detailed_model_element is a type of Representation_item.

EXPRESS specification:

```
*)
ENTITY detailed_model_element
  ABSTRACT SUPERTYPE
  SUBTYPE OF (representation_item);
END_ENTITY;
(*
```

### 4.3.3 Detailed_geometric_model_element

A Detailed_ geometric_model_element is a single element of a model that is any of the general class of elements that represent idealized shape described by mathematical geometry.

EXAMPLE - Points, curves, and surfaces are examples of elements that represent idealized shapes described by mathematical geometry.

A Detailed_ geometric_model_element is a type of Detailed_model _element (see 4.3.2).

EXPRESS specification:

```
*)
ENTITY detailed_geometric_model_element
  ABSTRACT SUPERTYPE
  SUBTYPE OF (detailed_model_element);
END_ENTITY;
(*
```

### 4.3.4 Geometric_model

A Geometric_model is a representation of shape. A Geometric_model that does not reference any Detailed_model_element (see 4.3.2) objects through one the subtypes directly shall reference at least one Template_instance (see 4.3.5).

EXPRESS specification:

```
*)
ENTITY geometric_model
  SUBTYPE OF (representation);
  is_defined_in : cartesian_coordinate_space;
  model_id      : STRING;
  version_id    : OPTIONAL STRING;
  description   : OPTIONAL STRING;
  role          : STRING;
  elements      : SET [1:?] OF detailed_model_element;
  model_extent  : OPTIONAL REAL;
  accuracy      : OPTIONAL REAL;
END_ENTITY;
(*
```

Attribute definitions:

**is_defined_in:** The is_defined_in specifies the Cartesian_coordinate_space (see 4.3.1) in which the Geometric_model is defined.

**model_id:** The model_id specifies the identifier of the Geometric_model.

**version_id:** The version_id specifies the version identifier of the Geometric_model. The version_id need not be specified.

**description:** The description specifies additional information about the Geometric_model. The description need not be specified for a particular Geometric_model. If present, there shall be exactly one object that defines the description for a Geometric_model.

**role:** The role specifies the function performed by the Geometric_model. Where applicable the following values shall be used:

— 'design shape': The geometry in the Geometric_model represents the shape of an item as designed;

— 'idealized shape': The geometry in the Geometric_model represents a simplified shape.

EXAMPLE - A shape may be simplified for analysis purposes.

**elements**: The elements specifies the Detailed_model_element instances which comprise the Geometric_model.

**model_extent**: The model_extent specifies the radius of a sphere that contains all elements of the model and whose centre is at the origin of the Cartesian_coordinate_space (see 4.3.1) of the Geometric_model. The model_extent need not be specified for a particular Geometric_model. A unit shall be associated with the model extent value.

**accuracy**: The accuracy specifies a distance which forms a zone of closure for elements in the model. The value forms the radius of a sphere around points/ vertices and a cylinder around curves wherein any other element within the zone is deemed to be coincident with the element being checked. A unit shall be associated with the accuracy value.

## 4.3.5 Template_instance

A Template_instance is an occurrence of an object that has been defined in a different Cartesian_-coordinate_space (see 4.3.1) as a Geometric_model (see 4.3.4). A Template_instance is an image copy of this template definition into another Cartesian_coordinate_space where only the location of this copy has to be specified. Additionally uniform scaling, rotation, or mirroring information may be applied to this copy.

NOTE - In the case where the units of the Cartesian_coordinate_space of the definition are different from the units to be applied to the Template_instance, unit conversion is required. In case of length unit conversion this has to be considered in addition to the scale attribute.

EXAMPLE - In a technical drawing of a mechanical part with several identical drilling holes the hole geometry (circle) together with its annotation elements (diameter dimension and centrelines) is defined once with the name 'annotated drilling hole' and the purpose 'drilling hole representation'. This particular definition is instantiated several times at different locations by corresponding Template_instance objects.

A Template_instance is a type of Detailed_model_element (see 4.3.2).

EXPRESS specification:

```
*)
ENTITY template_instance
  SUBTYPE OF (detailed_model_element);
  id                  : STRING;
  scale               : OPTIONAL REAL;
  template_definition : geometric_model;
  transformation      : transformation;
END_ENTITY;
(*
```

Attribute definitions:

**id:** The id specifies the identifier of the Template_instance.

**scale:** The scale specifies the scaling factor for all cartesian coordinate directions. The scaling factor shall be positive. If the scaling factor is omitted it shall be 1.0. The scale need not be specified for a particular Template_instance.

**template_definition:** The template_definition specifies the template to be instantiated. There shall be exactly one object that defines the template_definition for a Template_instance.

**transformation:** The transformation specifies the cartesian transformation applied to the instance. All transformations that can be expressed by an orthonormal 2 x 2 (for 2D) or 3 x 3 (for 3D) matrix can be applied.

EXAMPLE - Rotation or mirroring operations are examples to which these transformations can be applied.

### 4.3.6 Transformation

A Transformation is a geometric placement and orientation composed of translation and rotation. Scaling is not included.

EXPRESS specification:

```
*)
ENTITY transformation;
END_ENTITY;

END_SCHEMA;
(*
```

## 5 Module interpreted model

## 5.1 Mapping specification

This clause contains the mapping table that shows how each UoF and application element of this part of ISO 10303 (see clause 4) maps to one or several MIM resource constructs. The mapping table is organized in five columns. The contents of these five columns are:

Column 1) Application element: Name of an application element as it appears in the application entity definition. Application entity names are written in uppercase. Attribute names are listed after the application entity to which they belong and are written in lower case.

Column 2) MIM element: Name of an MIM element as it appears in the MIM, the term 'IDENTICAL MAPPING', or the term 'PATH'. MIM entities are written in lower case. Attribute names of MIM entities are referred to as <entity name>.<attribute name>. The mapping of an application element may result in several related MIM elements. Each of these MIM elements will require a line of its own in the table. The term 'IDENTICAL MAPPING' indicates that both application entities of an application assertion map to the same MIM element. The term 'PATH' indicates that the application assertion maps to the entire reference path.

Column 3) Source: For those MIM elements that are interpreted from the integrated resources, this is the number of the corresponding part of ISO 10303. For those MIM elements that are created for the purpose of this part of ISO 10303, this is the number of this part.

Column 4) Rules: One or more numbers may be given which refer to rules that apply to the current MIM element or reference path. For rules that are derived from relationships between application entities, the same rule is referred to by the mapping entries of all the involved MIM elements. The expanded names of the rules are listed after the table.

Column 5) Reference path: To describe fully the mapping of an application entity, it may be necessary to specify a reference path through several related MIM elements. The reference path column documents the role of a MIM element relative to the MIM element in the row succeeding it. Two or more such related MIM elements define the interpretation of the integrated resources that satisfies the requirement specified by the application entity. For each MIM element that has been created for use within this part of ISO 10303, a reference path up to its supertype from an integrated resource is specified.

For the expression of reference paths and the relationships between MIM elements, the following notational conventions apply:

[] : multiple MIM elements or sections of the reference path are required to satisfy an information requirement;

() : multiple MIM elements or sections of the reference path are identified as alternatives within the mapping to satisfy an information requirement;

{} : enclosed section constrains the reference path to satisfy an information requirement;

-> : attribute references the entity or select type given in the following row;

<- : entity or select type is referenced by the attribute in the following row;

[i] : attribute is an aggregation of which a single member is given in the following row;

[n] : attribute is an aggregation of which member n is given in the following row;

=> : entity is a supertype of the entity given in the following row;

<= : entity is a subtype of the entity given in the following row;

= : the string, select or enumeration type is constrained to a choice or value;

\ : the line continuation for strings that wrap.

## Table 1 - Mapping table for elemental_shape UoF

| Application_element | MIM element | Source | Rules | Reference path |
|---|---|---|---|---|
| CARTESIAN_-COORDINATE_SPACE | geometric_-representation_context | 42 | | |
| unit | global_unit_assigned_-context.units | 41 | | geometric_representation_context <= representation_context => global_unit_assigned_context global_unit_assigned_context.units |
| DETAILED_MODEL_-ELEMENT | representation_item | 1006 | | |
| DETAILED_-GEOMETRIC_-MODEL_ELEMENT | geometric_-representation_item | 42 | | |
| GEOMETRIC_MODEL | shape_representation | 41 | | |
| is_defined_in | PATH | | | shape_representation => representation representation.context_of_items -> representation_context => geometric_representation_context |
| model_id | representation.id | 1006 | | shape_representation <= representation representation.id |

## Table 1 - Mapping table for elemental_shape UoF

| Application_element | MIM element | Source | Rules | Reference path |
|---|---|---|---|---|
| version_id | applied_identification_-assignment.assigned_id | 1004 | | shape_representation<br>identification_item = shape_representation<br>identification_item <-<br>applied_identification_assignment.items[1]<br>applied_identification_assignment <=<br>identification_assignment<br>{identification_assignment.role -><br>identification_role<br>identification_role.name = 'version id'}<br>identification_assignment.assigned_id |
| description | representation.description | 1006 | | shape_representation <=<br>representation<br>representation.description |
| role | representation.name | 1006 | | shape_representation <=<br>representation<br>representation.name |
| elements | representation.items | 1006 | | shape_representation <=<br>representation<br>representation.items |

# Table 1 - Mapping table for elemental_shape UoF

| Application_element | MIM element | Source | Rules | Reference path |
|---|---|---|---|---|
| model_extent | value_representation_-item | 43 | | shape_representation <=<br>representation <-<br>representation_relationship.rep_1<br>representation_relationship<br>{representation_relationship.name = 'model extent association'}<br>representation_relationship.rep_2 ->representation<br>{representation.name = 'model extent representation'}<br>representation.items[i] ->representation_item =><br>{representation_item.name = 'model extent value'}<br>value_representation_item |
| accuracy | uncertainty_measure_-with_unit | 43 | | shape_representation <=<br>representation->representation_context=><br>global_uncertainty_assigned_context[i]->uncertainty_measure_with_unit<br>{uncertainty_measure_with_unit <=<br>measure_with_unit =><br>length_measure_with_unit} |
| TEMPLATE_INSTANCE | ([shape_representation_-relationship]<br>[representation_-relationship_with_-transformation])<br>(mapped_item) | 41<br>43<br>43 | | |

## Table 1 - Mapping table for elemental_shape UoF

| Application_element | MIM element | Source | Rules | Reference path |
|---|---|---|---|---|
| template_definition | (PATH)<br><br><br><br><br>(PATH) | | | (shape_representation_relationship<=<br>representation_relationship=><br>representation_relationship.rep_2-><br>representation)<br>(mapped_item.mapping_source-><br>representation_map.mapped_representation-><br>representation) |
| id | (representation_-<br>relationship.name)<br>(representation_-<br>item.name) | 43<br><br>1006 | | (representation_relationship_with_transformation<=<br>representation_relationship<br>representation_relationship.name)<br>(mapped_item<=<br>representation_item.name) |
| transformation | (PATH)<br><br><br><br><br><br>(PATH) | | | (shape_representation_relationship<=<br>representation_relationship=><br>representation_relationship_with_transformation.<br>transformation_operator-><br>[functionally_defined_transformation]<br>[item_defined_transformation]<br>(mapped_item<br>[mapped_item.mapping_target]<br>[mapped_item.mapping_source -><br>representation_map<br>representation_map.mapping_origin]) |

# Table 1 - Mapping table for elemental_shape UoF

| Application_element | MIM element | Source | Rules | Reference path |
|---|---|---|---|---|
| scale | (PATH)<br><br><br><br><br><br><br>(PATH) | | | (shape_representation_relationship<=<br>representation_relationship=><br>representation_relationship_with_transformation.<br>transformation_operator-><br>functionally_defined_transformation-><br>cartesian_transformation_operator<br>cartesian_transformation_operator.scale)<br>(mapped_item<br>mapped_item.mapping_target -><br>representation_item =><br>geometric_representation_item =><br>cartesian_transformation_operator<br>cartesian_transformation_operator.scale) |
| TRANSFORMATION | (functionally_defined_-<br>transformation)<br>(item_defined_-<br>transformation)<br>(mapped_item) | 43<br><br>43<br><br>43 | | |

## 5.2 MIM EXPRESS short listing

This clause specifies the EXPRESS schema that uses elements from the integrated resources, application interpreted constructs or application module MIMs and contains the types, entity specializations, rules, and functions that are specific to this part of ISO 10303. This clause also specifies modifications to the textual material for constructs that are imported from the integrated resources. The definitions and EXPRESS provided in the integrated resources or application interpreted constructs for constructs used in the MIM may include select list items and subtypes which are not imported into the MIM. Requirements stated in the integrated resources or application interpreted constructs which refer to such items and subtypes apply exclusively to those items which are imported into the MIM.

EXPRESS Specification:

```
*)
SCHEMA elemental_shape_mim;
  USE FROM foundation_representation_mim; -- ISO 10303-1006
  USE FROM basic_attribute_schema -- ISO 10303-41
      (description_attribute);
  USE FROM geometry_schema -- ISO 10303-42
      (geometric_representation_item,
       geometric_representation_context,
       cartesian_point,
       placement,
       axis1_placement,
       axis2_placement_2d,
       axis2_placement_3d,
       cartesian_transformation_operator,
       cartesian_transformation_operator_2d,
       cartesian_transformation_operator_3d);
  USE FROM measure_schema -- ISO 10303-41
      (global_unit_assigned_context);
  USE FROM management_resources_schema -- ISO 10303-41
      (identification_assignment);
  USE FROM product_property_representation_schema -- ISO 10303-41
      (shape_representation,
       shape_representation_relationship);
  USE FROM representation_schema -- ISO 10303-43
      (functionally_defined_transformation,
       global_uncertainty_assigned_context,
       item_defined_transformation,
       mapped_item,
       representation_relationship_with_transformation,
       uncertainty_measure_with_unit,
       value_representation_item);
(*
```

NOTE 1 - See annex D for a graphical presentation of this schema using the EXPRESS-G notation.

NOTE 2 - The schema referenced above can be found in the following part of ISO 10303:

| | |
|---|---|
| management_resources_schema | ISO 10303-41 |
| measure_schema | ISO 10303-41 |

| | |
|---|---|
| basic_attribute_schema | ISO 10303-41 |
| product_property_representation_schema | ISO 10303-41 |
| geometry_schema | ISO 10303-42 |
| representation_schema | ISO 10303-43 |
| foundation_representation_mim | ISO 10303-1006 |

## 5.2.1 Application module type definitions

This subclause contains the EXPRESS type definitions in this part of ISO 10303.

### 5.2.1.1 identification_item

An **identification_item** is an element which may have an identification.

EXPRESS specification:

```
*)
TYPE identification_item  = SELECT
  (representation);
END_TYPE;
(*
```

## 5.2.2 Module entity definitions

This subclause contains the EXPRESS entity definitions in this part of ISO 10303.

### 5.2.2.1 applied_identification_assignment

An **applied_identification_assignment** assigns an identification to a **representation**.

EXPRESS specification:

```
*)
ENTITY applied_identification_assignment
  SUBTYPE OF (identification_assignment);
  items : SET[1:?] OF identification_item;
END_ENTITY;
(*
```

Attribute definitions:

**items:** The set of one or more elements to which an identification may be assigned.

EXPRESS specification:

```
*)
END_SCHEMA;
(*
```

# Annex A
(normative)

# MIM short names

Table A.1 provides the short names for entities defined in the MIM of this part of ISO 10303. Requirements on the use of the short names are found in the implementation methods included in ISO 10303. The EXPRESS MIM short names are available from the Internet:

<http://www.mel.nist.gov/div826/subject/apde/snr/>

## Table A.1 - MIM short names of entities

| Entity name | Short name |
|---|---|
| APPLIED_IDENTIFICATION_ASSIGNMENT | APIDAS |

# Annex B
(normative)

# Information object registration

## B.1 Document identification

To provide for unambiguous identification of an information object in an open system, the object identifier

{ iso standard 10303 part(1004) version(-1) }

is assigned to this part of ISO 10303. The meaning of this value is defined in ISO/IEC 8824-1, and is described in ISO 10303-1.

## B.2 Schema identification

To provide for unambiguous identification of the schema specification given in this application module in an open information system, the object identifiers are assigned as follows:

{ iso standard 10303 part(1004) version(0) object(1) elemental-shape-arm-schema(1) }

is assigned to the elemental_shape_arm schema.

{ iso standard 10303 part(1004) version(0) object(2) elemental-shape-mim-schema(1) }

is assigned to the elemental_shape_mim schema short form schema (see 5.2). The meaning of this value is defined in ISO 8824-1, and is described in ISO 10303-1.

# Annex C
(informative)

# ARM EXPRESS-G

The following diagrams correspond to the ARM EXPRESS listing given in clause 4. The diagrams use the EXPRESS-G graphical notation for the EXPRESS language. EXPRESS-G is defined in annex D of ISO 10303-11.

NOTE - The inter-page referencing is to the diagram number and not the figure number.

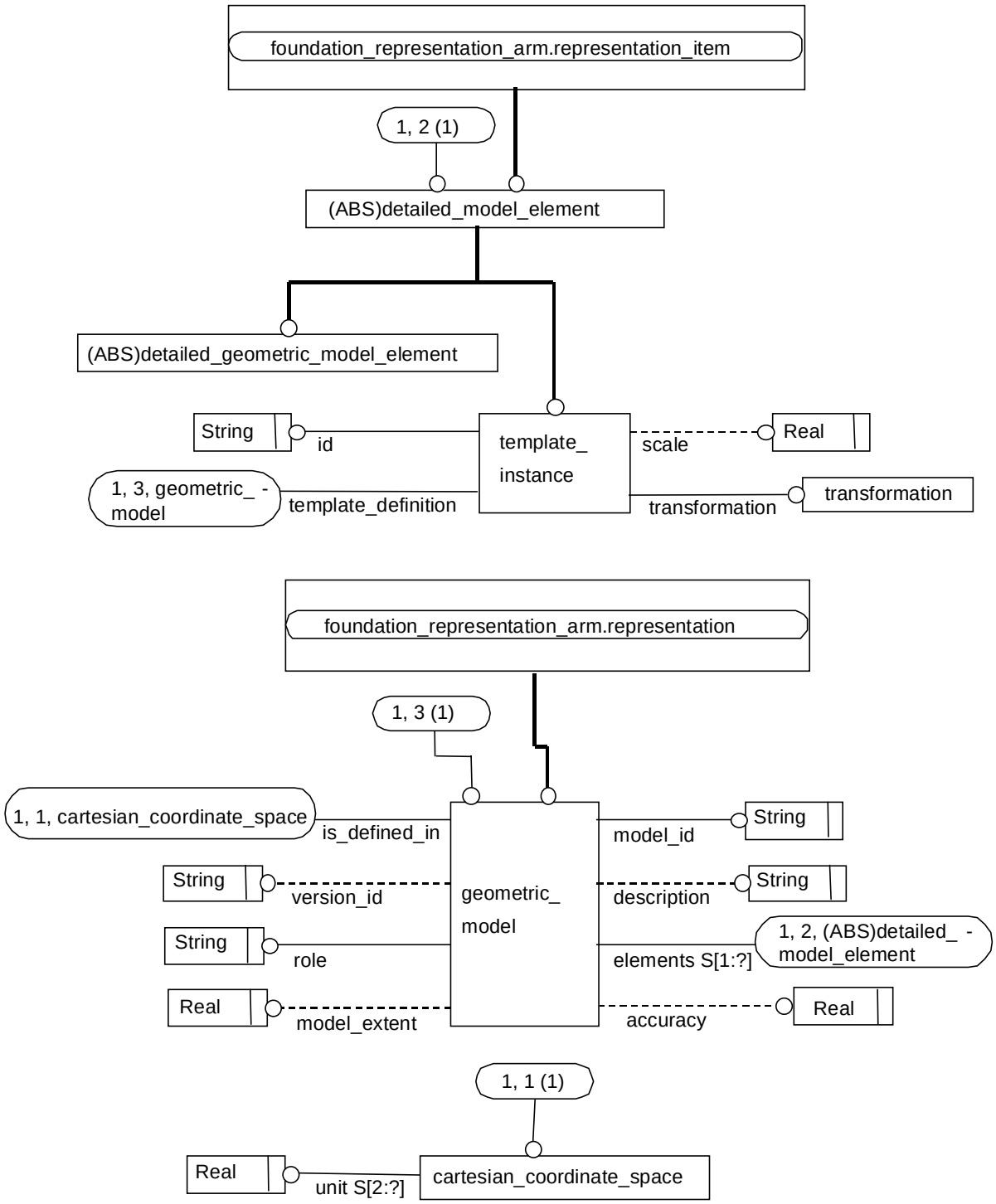



**Figure C.1 - ARM EXPRESS-G diagram 1 of 1**

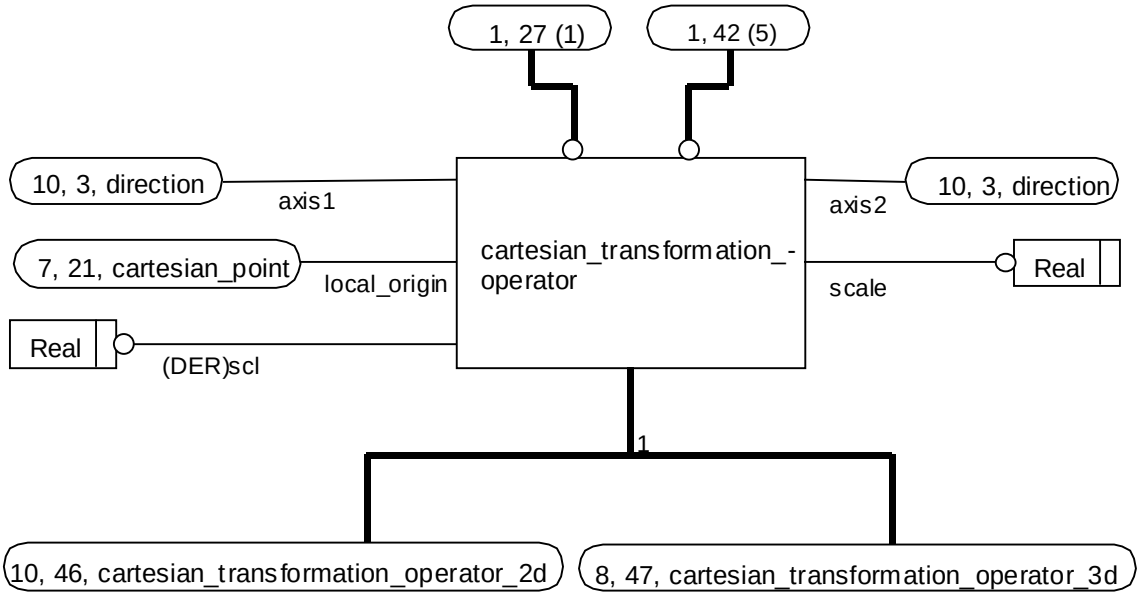
# Annex D
(informative)

## MIM EXPRESS-G

The following diagrams correspond to the MIM EXPRESS expanded listing. The diagrams use the EXPRESS-G graphical notation for the EXPRESS language. EXPRESS-G is defined in annex D of ISO 10303-11.

NOTE - The inter-page referencing is to the diagram number and not the figure number.



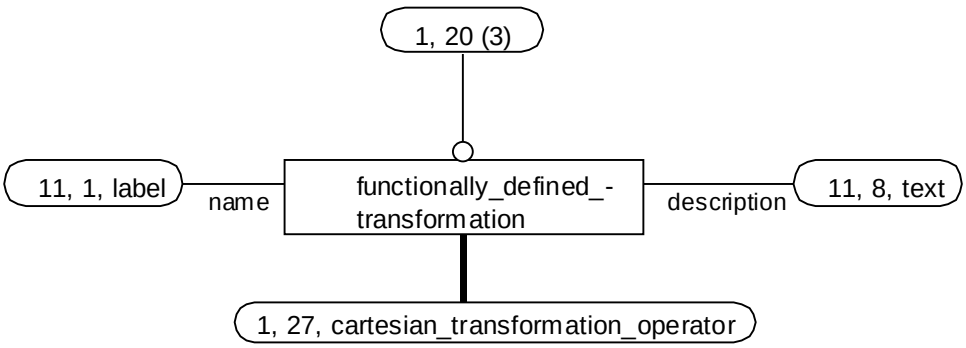




**Figure D.1 - MIM EXPRESS-G diagram 1 of 12**

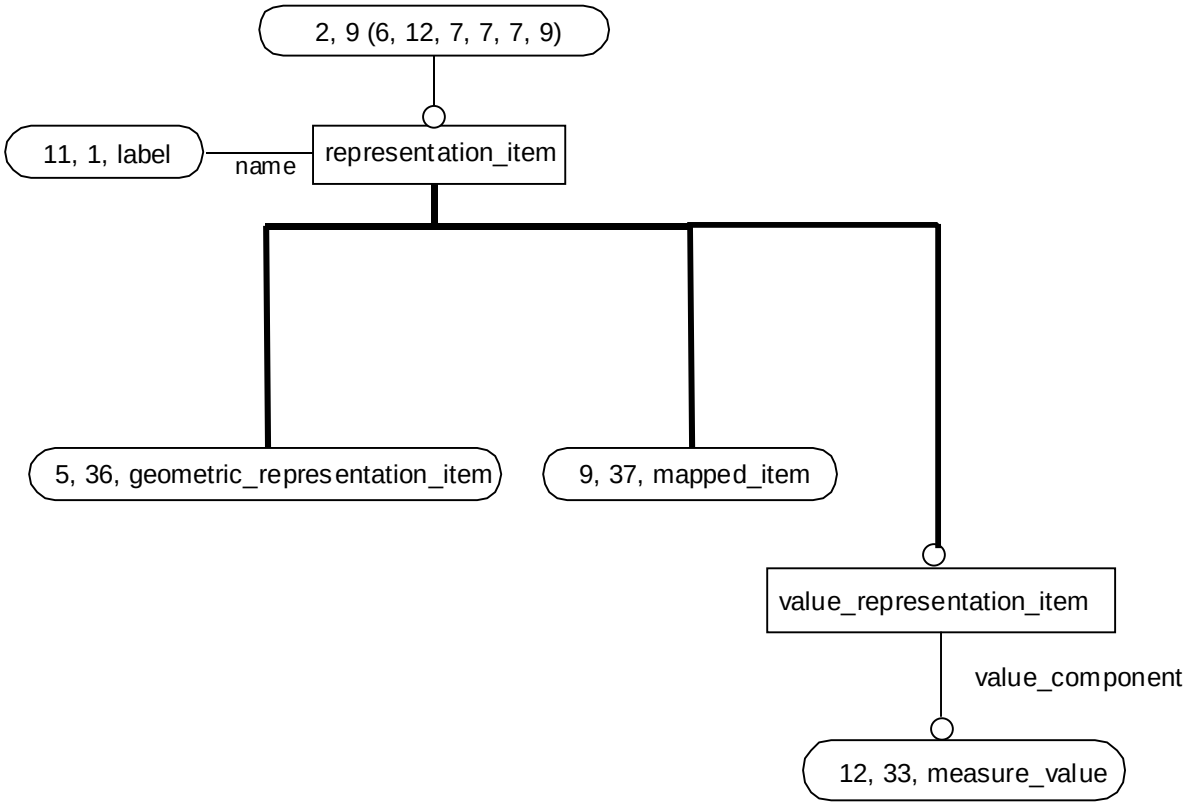



**Figure D.2 - MIM EXPRESS-G diagram 2 of 12**

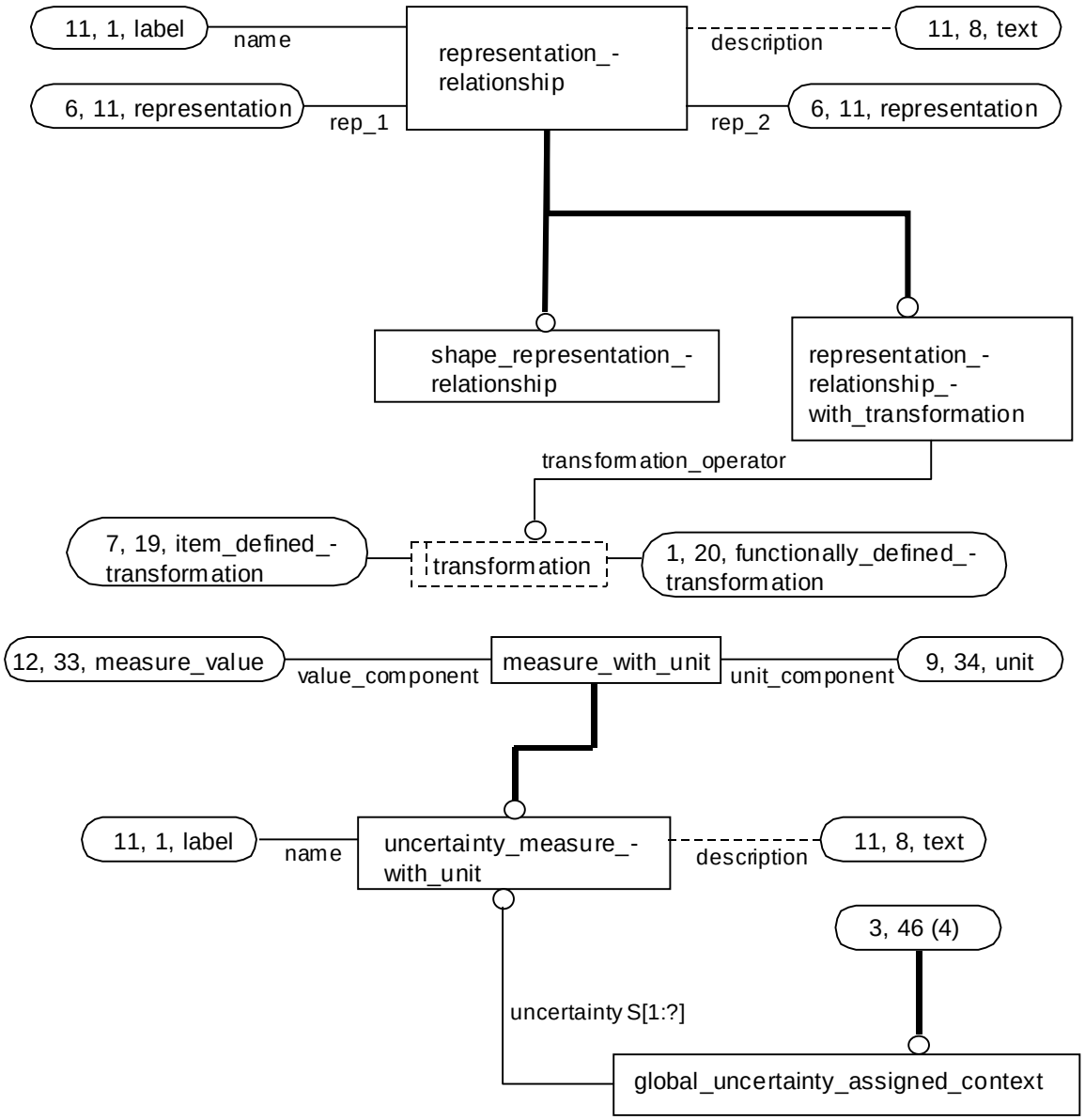



**Figure D.3 - MIM EXPRESS-G diagram 3 of 12**

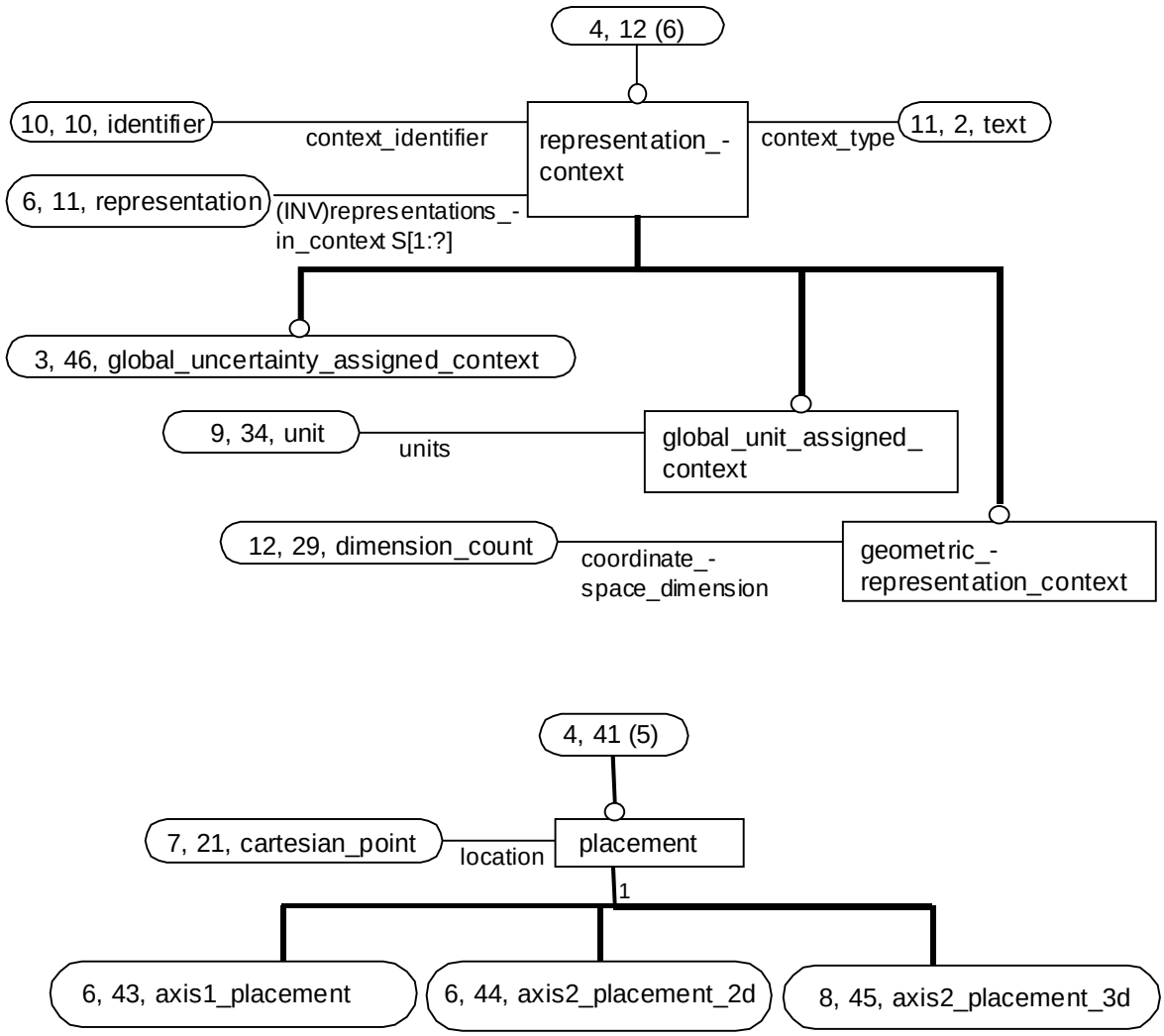



**Figure D.4 - MIM EXPRESS-G diagram 4 of 12**

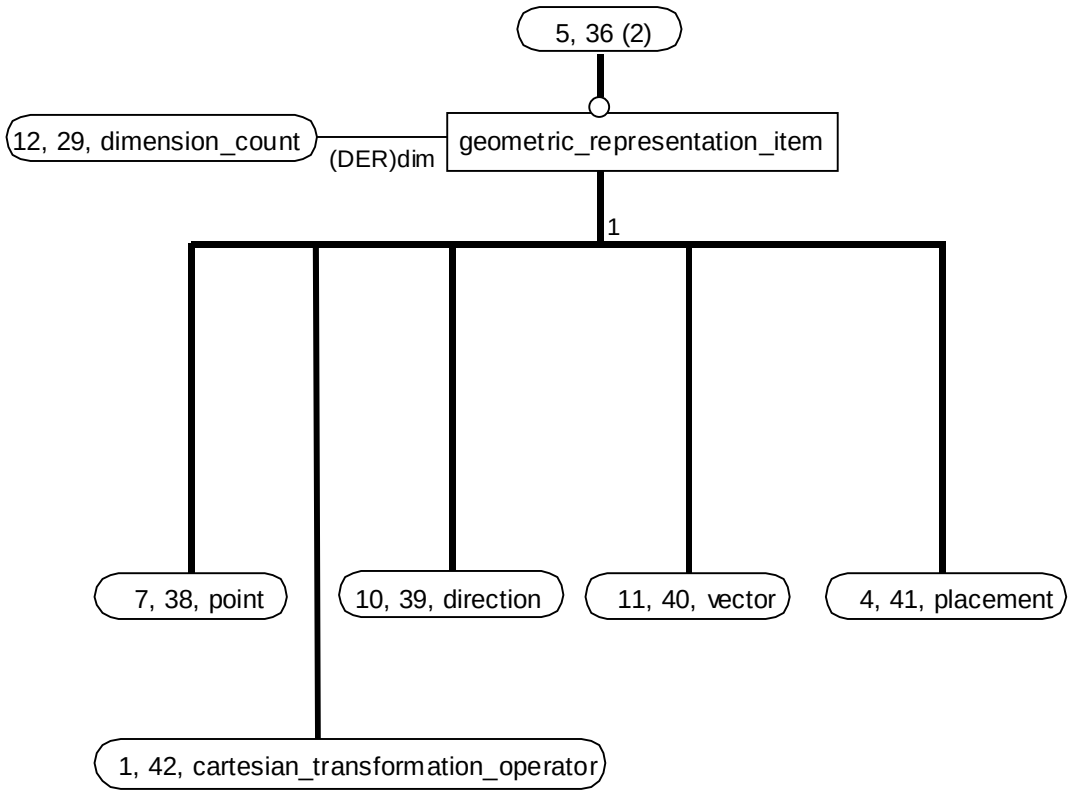



**Figure D.5 - MIM EXPRESS-G diagram 5 of 12**

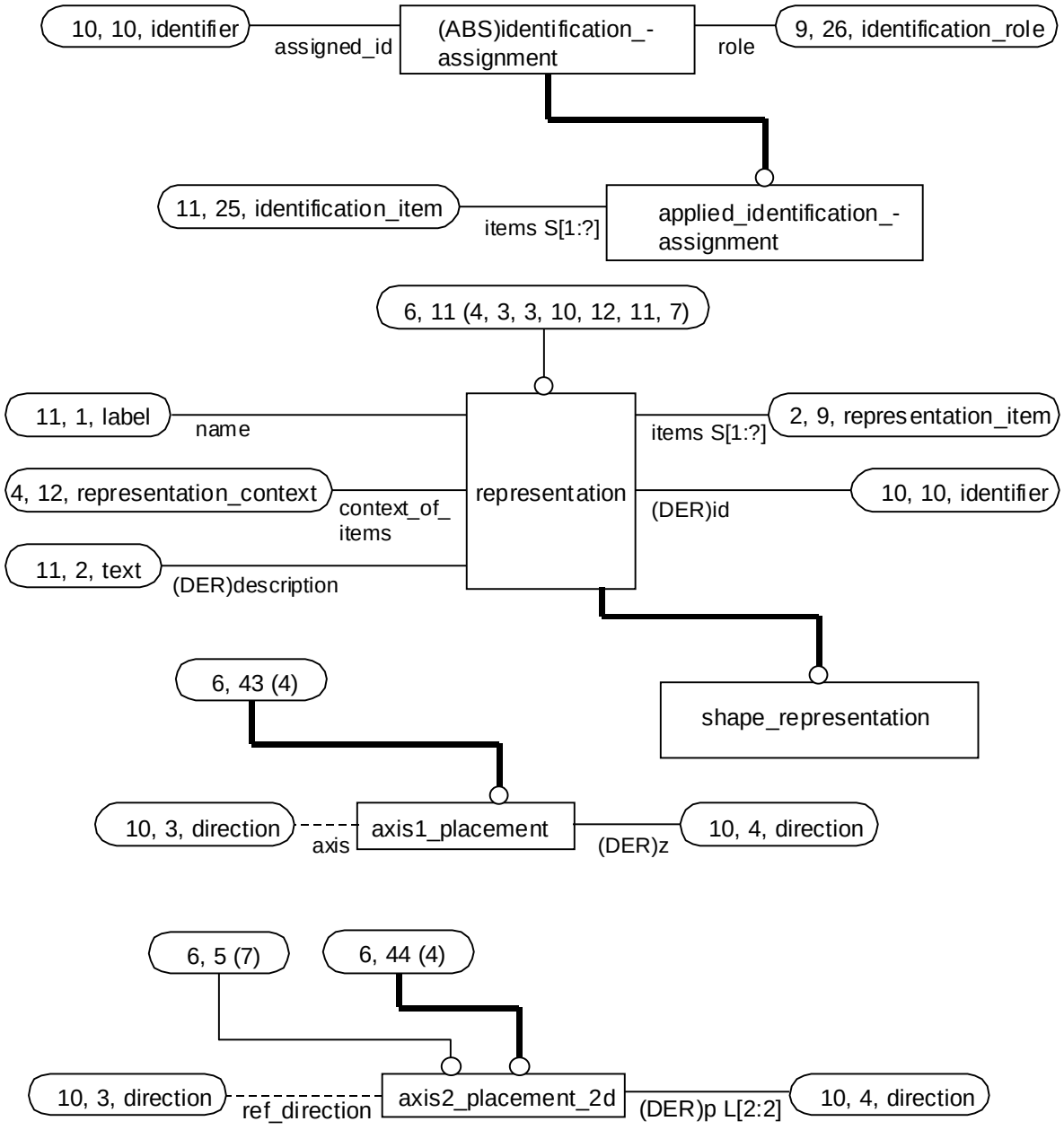



**Figure D.6 - MIM EXPRESS-G diagram 6 of 12**

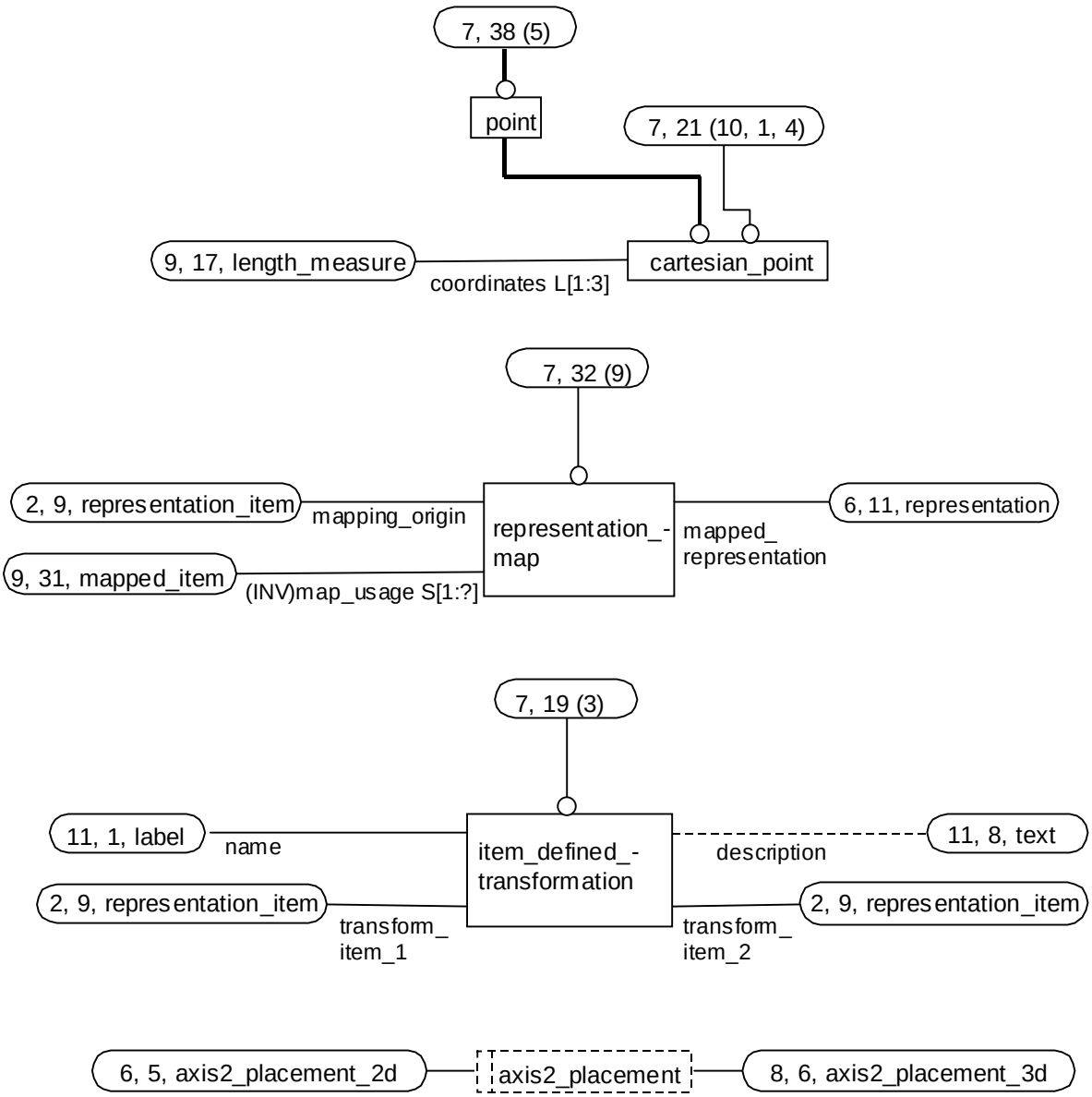



**Figure D.7 - MIM EXPRESS-G diagram 7 of 12**

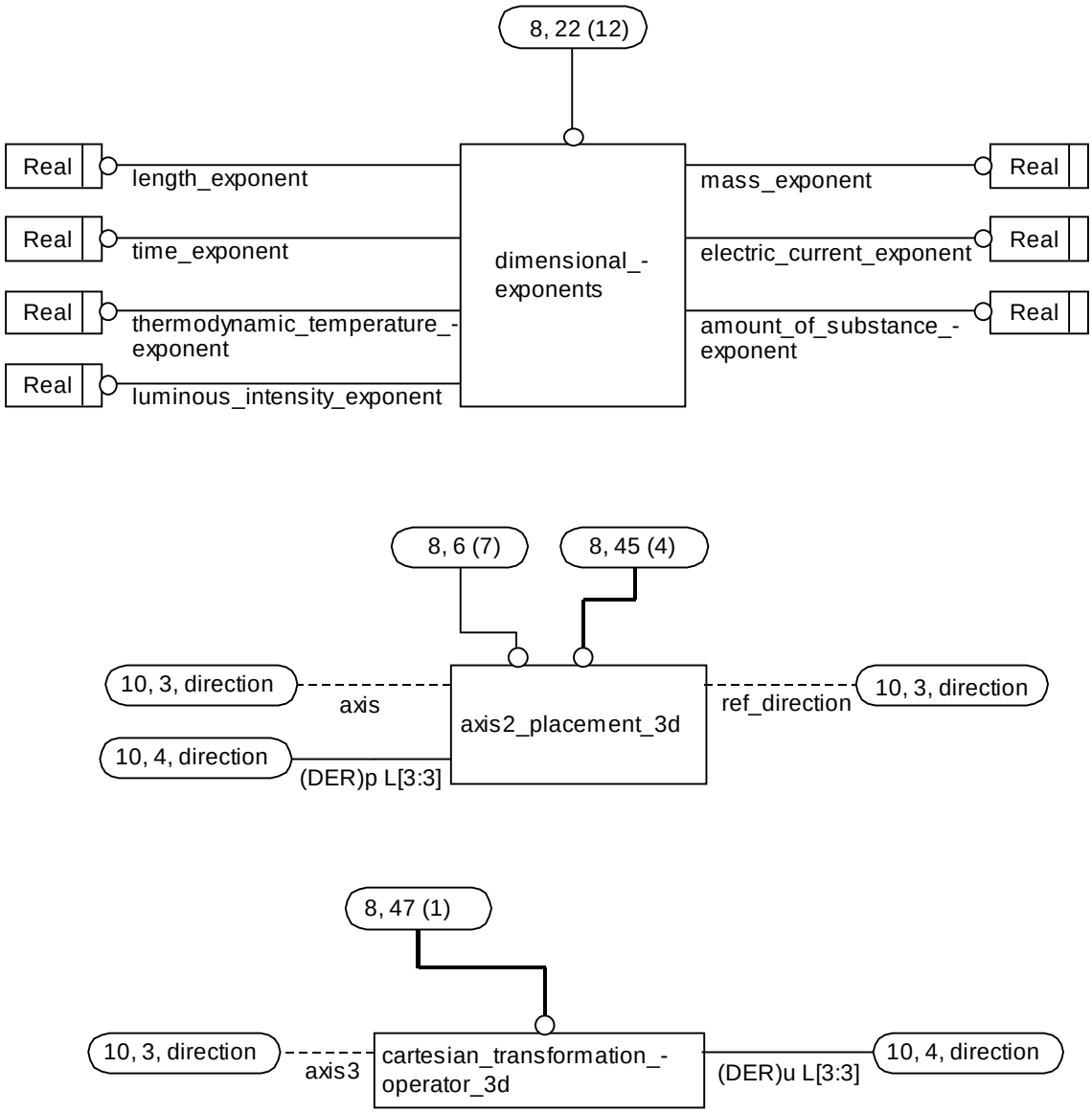



**Figure D.8 - MIM EXPRESS-G diagram 8 of 12**

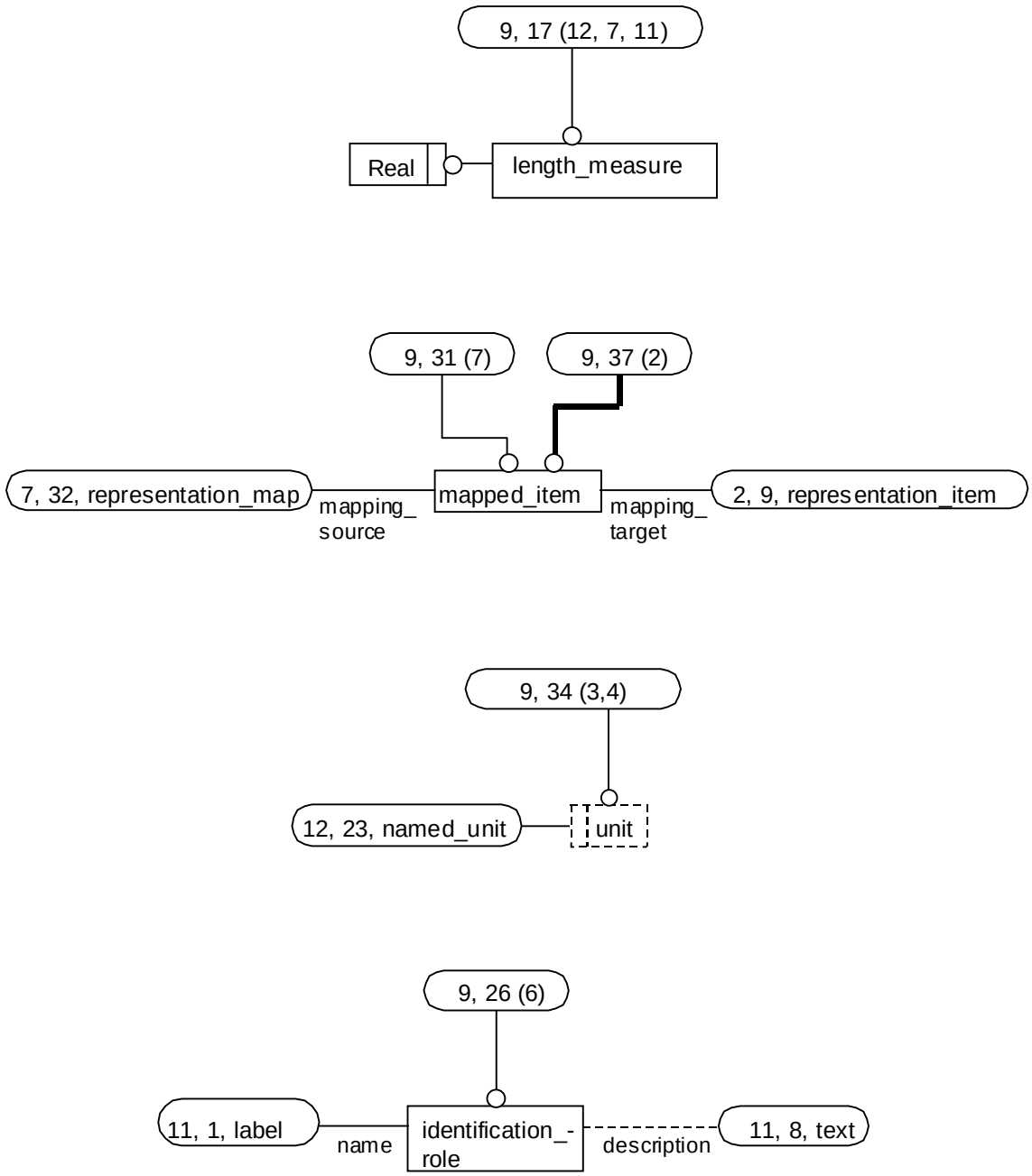



**Figure D.9 - MIM EXPRESS-G diagram 9 of 12**

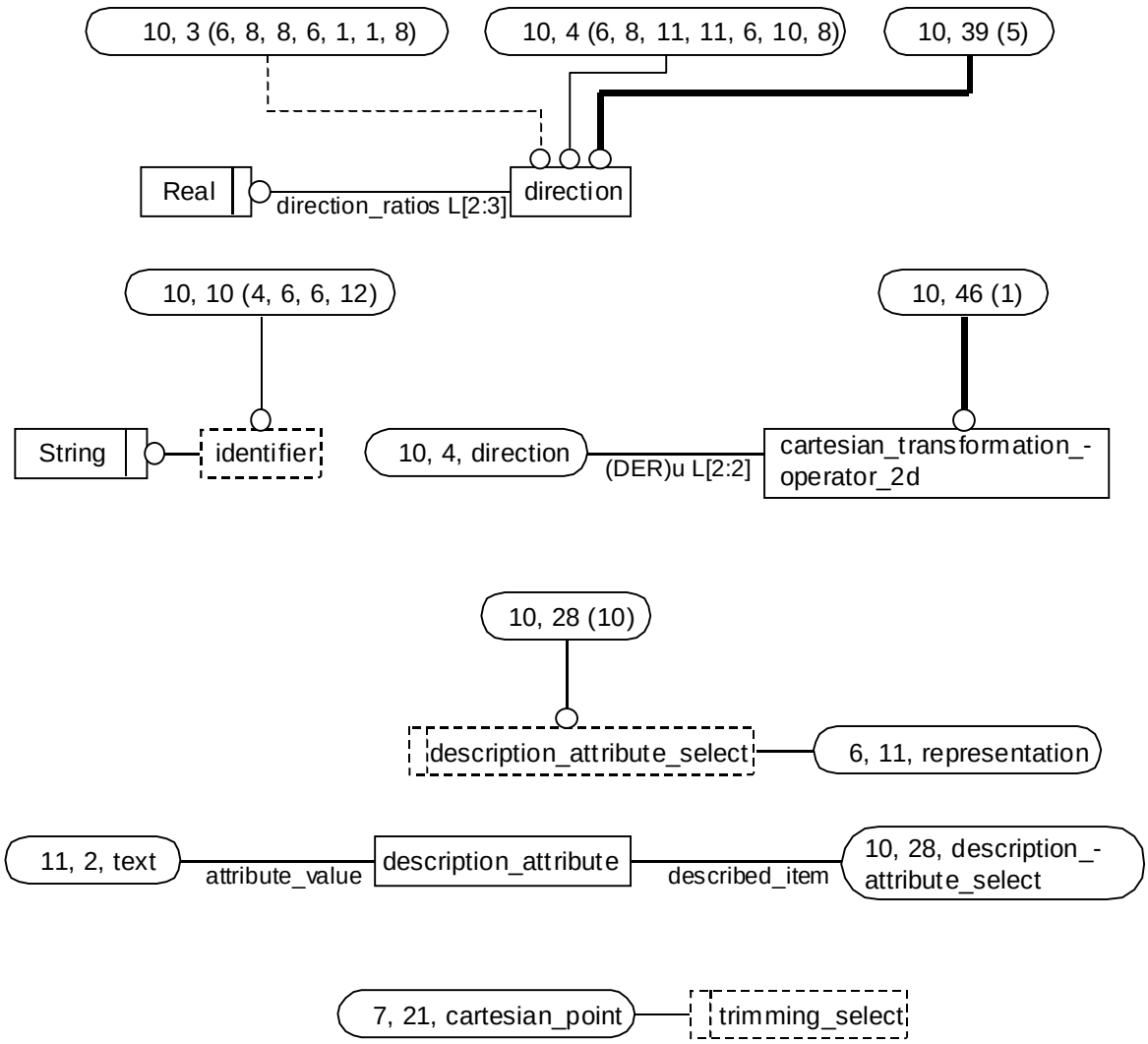



**Figure D.10 - MIM EXPRESS-G diagram 10 of 12**

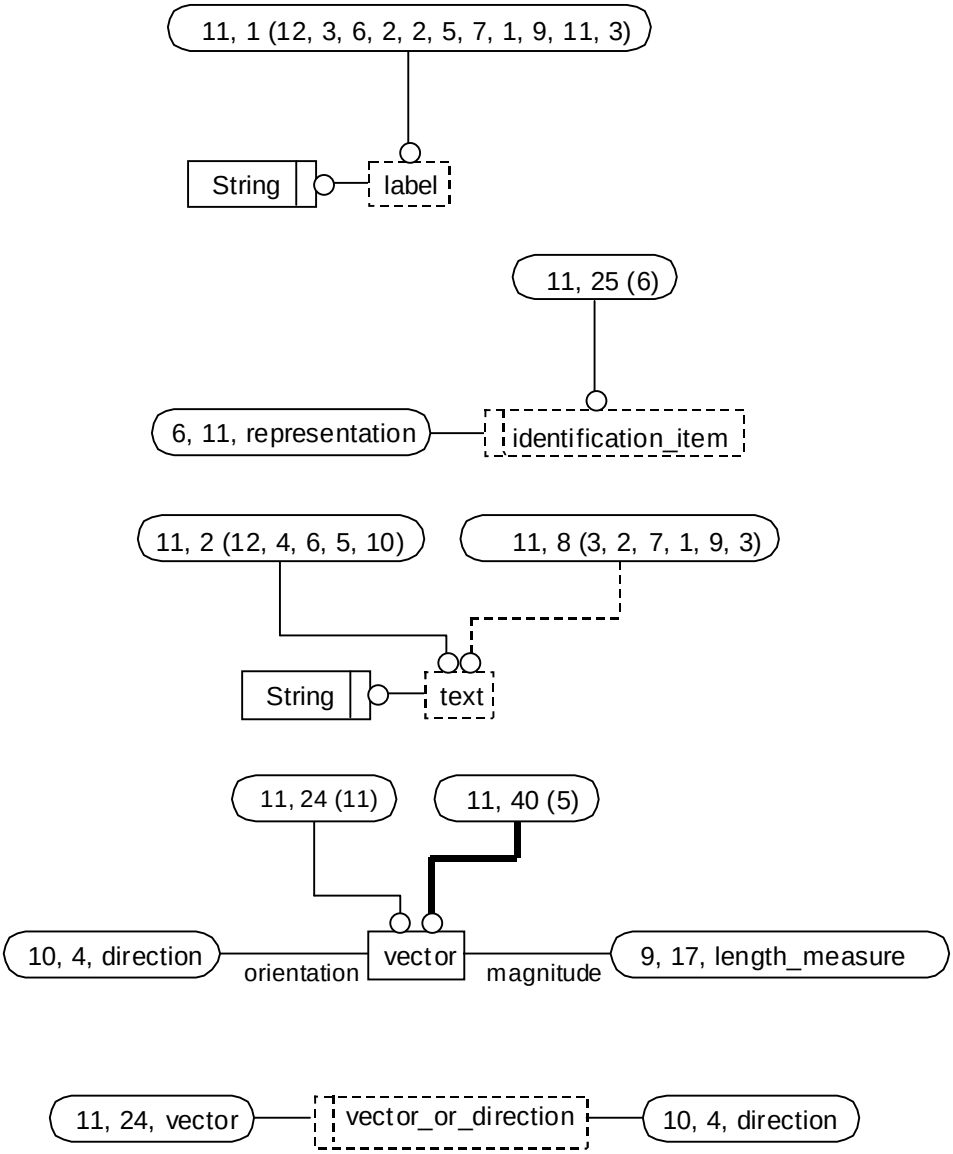



**Figure D.11 - MIM EXPRESS-G diagram 11 of 12**

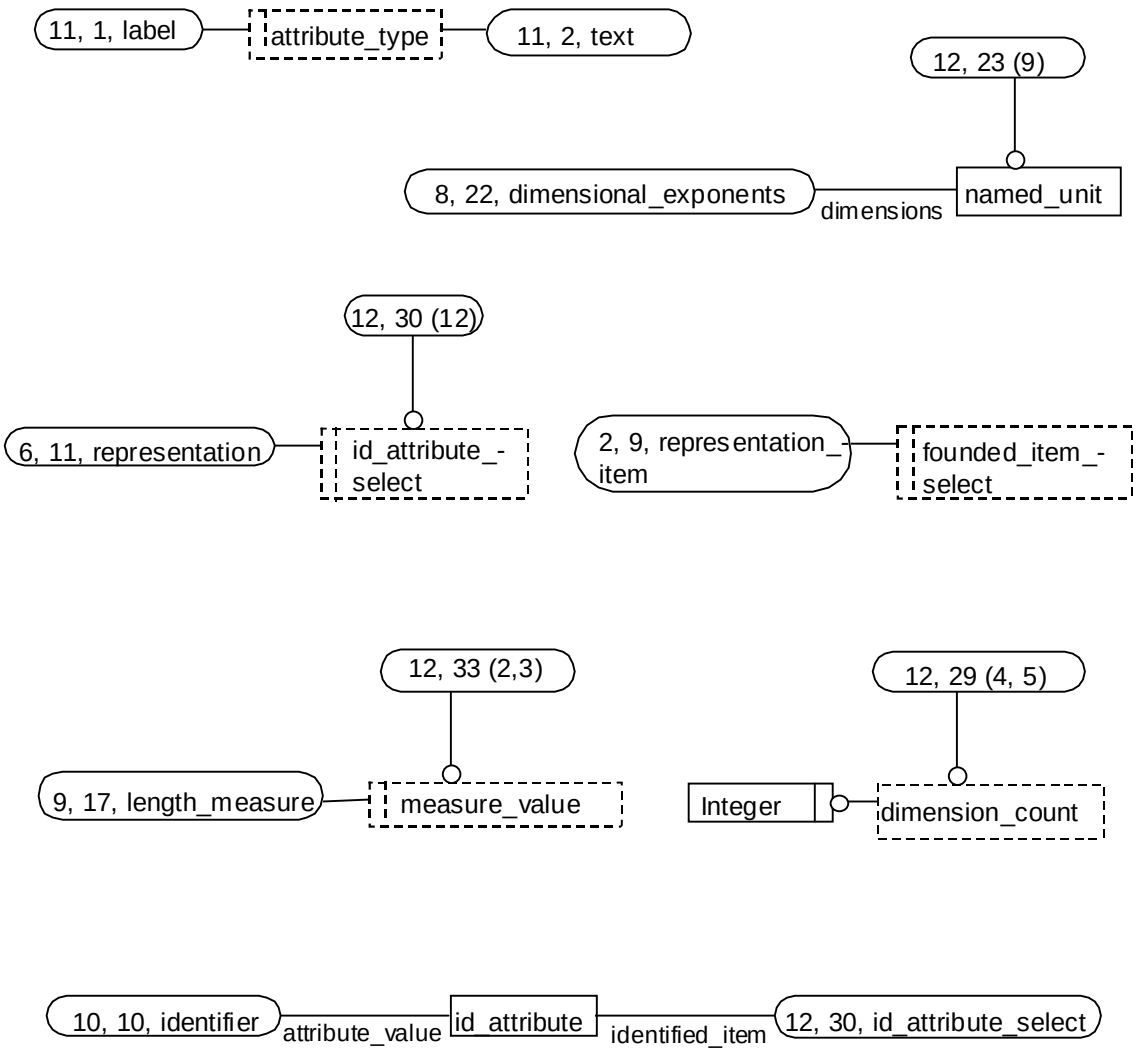



**Figure D.12 - MIM EXPRESS-G diagram 12 of 12**

# Annex E
(informative)

# AM ARM and MIM EXPRESS

This annex provides a listing of the EXPRESS for the ARM specified in clause 4 and EXPRESS schema specified in 5.2 of this part of ISO 10303 without comments or other explanatory text. The content of this annex is available in computer-interpretable form and can be found at the following URLs:

<http://www.nist.gov/sc4/nwi_pwi/nwi/step/part1004/elemental_shape_arm.exp>

<http://www.nist.gov/sc4/nwi_pwi/nwi/step/part1004/elemental_shape_mim.exp>

# Bibliography

[1] ISO 10303-1001:[1] Industrial automation systems and integration — Product data representation and exchange — Application module: Appearance assignment.

[2] ISO 10303-1002:[1] Industrial automation systems and integration — Product data representation and exchange — Application module: Colour.

[3] ISO 10303-1003:[1] Industrial automation systems and integration — Product data representation and exchange — Application module: Curve appearance.

[4] ISO 10303-1005:[1] Industrial automation systems and integration — Product data representation and exchange — Application module: Elemental topological shape.

[5] ISO 10303-1006:[1] Industrial automation systems and integration — Product data representation and exchange — Application module: Foundation representation.

[6] ISO 10303-1007:[1] Industrial automation systems and integration — Product data representation and exchange — Application module: General surface appearance.

[7] ISO 10303-1008:[1] Industrial automation systems and integration — Application module: Layer assignment.

[8] ISO 10303-1009:[1] Industrial automation systems and integration — Product data representation and exchange — Application module: Shape appearance and layers.

[9] ISO TC 184/SC4 1997, Proposed Standing Document — Guidelines for application module development, revision 0.6 <http://wg10step.aticorp.org/Deliverables/Guidelines/AMContent/Draft6/AMConGde06.html >.

[1)] To be published

# Index

